



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,799	10/30/2002	Ralph Etienne-Cummings	03940012AA	1099

30743 7590 09/28/2005

WHITHAM, CURTIS & CHRISTOFFERSON, P.C.  
11491 SUNSET HILLS ROAD  
SUITE 340  
RESTON, VA 20190

EXAMINER

MARC, MCDIEUNEL

ART UNIT PAPER NUMBER

3661

DATE MAILED: 09/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/009,799

**Applicant(s)**

ETIENNE-CUMMINGS ET AL.

**Examiner**

McDieunel Marc

**Art Unit**

3661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 52-54 and 65-67 is/are allowed.
- 6) ☒ Claim(s) 1,4-8,11-14,16-23,25-27,30-34,37-40,42-48,50,51 and 55-64 is/are rejected.
- 7) ☒ Claim(s) 2,3,10,15,24,28,29,36,41 and 49 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Claims 1-67 are pending in the application.
2. The rejection to claims **1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64** under 35 U.S.C. 102(e) as being anticipated by **Jacobs** (U.S. Pat. No. **6,532,400 B1**) is **withdrawn**.

The objection to claims 2, 3, 10, 15, 24, 28, 29, 36, 41 and 49 is also **maintained**.

3. Applicant's arguments with respect to claims 1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64 have been considered but are moot in view of the new ground(s) of rejection.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims **1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64** are rejected under 35 U.S.C. 102(a) as being anticipated by **Billard et al. (*Biologically Inspired neural controllers for motor control in a quadruped robot*, 2000)**.

As per claims 1, 4-8, 11-14, 16-23, 25-27, 30-34, 37-40, 42-48, 50, 51 and 55-64,

Billard et al. teaches This paper presents **biologically inspired neural controllers** for generating motor patterns in a quadruped robot. Sets of artificial neural networks are presented which provide 1) pattern generation and gait control, allowing continuous passage from walking to trotting to galloping, 2) control of sitting and lying down behaviors, and 3) control of scratching. The neural controllers consist of sets of oscillators composed of leaky-integrator neurons, which control pairs of flexor-extensor muscles attached to each joint. The networks receive sensory feedback proportional to the contraction of simulated muscles and to joint flexion. Similarly to what is observed in cats, locomotion can be initiated by either applying tonic (i.e. non-oscillating) input to the locomotion network or by sensory feedback from extending the legs. The networks are implemented in a quadruped robot. It is shown that computation can be carried out in real time and that the networks can generate the above mentioned motor behaviors (see abstract) which equates the inventive concept. With respect to (central pattern generator (CPG))<sup>1</sup> (see page 1, section 1 and page 2), which covers the entire invention (see entire document).

---

<sup>1</sup> Note: Walk animals generate a rhythm of each leg in a CPG (central pattern generator), which is a spine level oscillator group. Autonomous decentralized multi-legged robot system imitating the mechanism of a CPG. Each leg is an independent robot with a nonlinear oscillator, and the whole system performs the function of CPG by local communications between neighbor legs. Also humanoid is included in the type of rhythm pattern.

***Allowable Subject Matter***

6. Claims 52-54 and 65-67 are allowed.

7. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fail to teach or fairly suggest with respect to claim 52, a method for controlling a mechanical or biological system for rhythmic movement, comprising: (A) measuring sensory feedback to obtain measured sensory feedback; (B) processing the measured sensory feedback to obtain data for a plurality of designated parameters; and (C) via a central pattern generator-based system, applying a set of rules to the obtained data to generate at least one signal for commanding the limb or biological system for rhythmic movement, wherein the central pattern generator-based system comprises a circuit that mimics a biological central pattern generator. With respect to claim 65, a method for modifying a continuous waveform provided by a non-biological central pattern generator, comprising the steps of: (A) provision of a continuous waveform by a non-biological central pattern generator; (B) provision of sensory feedback to the non-biological central pattern generator; (C) rule-application by the non-biological central pattern generator to the sensory feedback; (D) based on the rule-application, determination by the non-biological central pattern generator to modify or maintain the continuous wave form.

8. Claims 2, 3, 10, 15, 24, 28, 29, 36, 41 and 49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fail to teach or fairly suggest with respect to claims 2 and 28, a system, including a system for phase adjustment of the central pattern generator based on a sensory trigger in or derived from sensory feedback. With respect to claims 3 and 29, a system for phase adjustment of the central pattern generator based on at least one sensory trigger in or derived from sensory-feedback; and a system for controlling firing frequency of motoneurons as a function of the sensory feedback or the sensory trigger. With respect to claims 9 and 35, a system including at least one chip that includes dynamic memories and phase modulators. With respect to claims 10 and 36, a system, wherein the system is a non-linear oscillator including electronic analogues of biological neurons, synapses and time-constraints, dynamic memories and phase modulators. With respect to claim 15 and 41, a system, wherein phasic coupling is in-phase, 180 degrees out of phase, or any number of degrees out of phase. With respect to claim 24 and 49, a system, including a system for phase adjustment of

Art Unit: 3661


the central pattern generator based on at least one sensory trigger in the received sensory feedback.

### ***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to McDieunel Marc whose telephone number is (571) 272-6964. The examiner can normally be reached on 6:30-5:00 Mon-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Black can be reached on (571) 272-6956. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
McDieunel Marc

Friday, September 23, 2005

MM/